

REMARKS

Claims 41, 42, and 45–67 are pending in the above identified application. The Examiner has allowed claims 41 and 42. The Examiner has rejected claims 45–51, 53–56, 58, and 59 and objected to claims 52, 57, and 60–67. Applicants have amended independent claim 45 to include a limitation of Claim 47. Applicants also amended dependent claims 46 and 47 to more precisely describe the present invention. No new matter has been added by these amendments.

Claim Objections

Claim 46 has been amended to overcome the Examiner's objection that "it is unclear how the bandpass filter can provide an optical signal as an input and an electrical signal as an output." Office Action of May 25, 2004, p. 2. In particular, claim 46 has been amended to reflect that the output of the converting means is "the particular wavelength portion of the optical signal," rather than an electrical signal.

Claim Rejections under 35 U.S.C. § 103

Claims 45-47

The Examiner has rejected claims 45–47 and 49 under 35 U.S.C. § 103(a) as being allegedly unpatentable over U.S. Patent No. 5,894,362 to Onaka et al. (hereafter "Onaka"). Claim 45 has been amended to more clearly indicate the invention. In particular, claim 45 has been amended to recite "wherein the converting means comprises an optical unit having the optical signal as an input and the particular wavelength portion as an output." Onaka does not teach this feature of the invention.

Instead, Onaka teaches a diffraction grating, described as "a dispersion unit which simultaneously disperses different wavelength components of the monitoring signal in different directions." (Onaka, col. 4, lines 62–65). Onaka further teaches a system comprising a photodetector

array “including opto-electric conversion elements at fixed positions for receiving the wavelength components dispersed from the dispersion unit without rotating or moving the dispersion unit.” (Onaka, col. 4, line 66 to col. 5, line 2). The diffraction grating taught by Onaka separates the optical signal into its various wavelength components and allows the entire spectrum of input light to pass through to the photodetector array.

Onaka, therefore, does not teach “an optical unit having the optical signal as an input and the *particular wavelength* portion as an output.” (emphasis added) as recited in claim 45; and as a result Claim 45 is patentable over Onaka.

Claims 46 and 47 depend from claim 45 and therefore are allowable over Onaka for at least the same reasons as is claim 45.

Claim 48

The Examiner has rejected claim 48 under 35 U.S.C. § 103(a) as being allegedly unpatentable over Onaka in view of U.S. Patent No. 5,617,234 to Koga et al. (hereafter “Koga”).

As indicated above, Onaka does not teach “an optical unit having the optical signal as an input and the particular wavelength portion as an output,” as recited in claim 45. Koga does not cure the defect in the teachings of Onaka. Therefore, claim 48, which depends from claim 47, which depends from claim 45 is allowable over the combination of Onaka and Koga for at least the same reasons as is claim 45.

Claim 49

The Examiner has rejected claim 46 under 35 U.S.C. § 103(a) as being allegedly unpatentable over Onaka, stating that Onaka teaches “the optical unit comprising a grating spectrometer (see Col. 4,

lines 39-44 and Col. 8, lines 54-56) having the optical signal as an input and providing the particular wavelength portion as an output. Office Action of May 25, 2004, p. 3, ll. 15-17. As discussed above, spectroscope of Onaka is “a dispersion unit which simultaneously disperses different wavelength components of the monitoring signal in different directions.” Onaka, col. 4, lines 62-65. Therefore spectroscope of Onaka does not produce “the particular wavelength portion as an output,” as required by Claim 49. For this reason Claim 49 is patentable over Onaka.

Also Claim 49 is dependent on Claim 45 and is patentable for at least the same reasons as is claim 45.

Claim 50

The Examiner has rejected claim 50 under 35 U.S.C. § 103(a) as being allegedly unpatentable over Onaka in view of U.S. Patent No. 5,796,479 to Derickson et al. (hereafter “Derickson”).

As indicated above, Onaka does not teach “an optical unit having the optical signal as an input and the particular wavelength portion as an output,” as recited in claim 45. Derickson does not cure the defect in the teachings of Onaka. Therefore, claim 50, which depends indirectly from claim 45 is allowable over the combination of Onaka and Derickson for at least the same reasons as is claim 45.

Claim 51

The Examiner has rejected claim 51 under 35 U.S.C. § 103(a) as being allegedly unpatentable over Onaka in view of Derickson as applied to Claim 50, further in view of U.S. Patent No. 6,069,697 to Tanimoto et al. (hereafter “Tanimoto”).

The Examiner stated in his rejection that Tanimoto teaches “a Fastie-Ebert instrument.” Office Action of May 25, 2004, p. 7, l. 9. Claim 51 calls for a system “according to Ebert and Fastie,” which is different from Fastie-Ebert arrangement as described below.

Originally Ebert developed an “in-plane” arrangement, where the input slit and output slit are on the same plane as the grating grooves, and the reflecting element is positioned in parallel to the plane of the grating. Fastie has contributed the “out-of-plane” arrangement where the grating is no longer on the same plane as the slits, but is moved towards the reflecting element. Such arrangement is called Fastie or Ebert-Fastie, if . See “ “The Optics of Spectroscopy,” Lerner and Levinson, Section 2.2; U.S. Patent No. 2,922,331 to Fastie et al.; “Analytical emission spectroscopy,” E. L. Grove, New York, M. Dekker pp. 255-309 (1971).

According to the present system, the optical signal first passes through the arrangement according to Ebert and then according to Fastie, using the same structural elements. In alternative the optical signal can first go through Fastie arrangement and then Ebert. These arrangements, with multiple passages of the optical signal through the dispersive element, greatly improve the resolution of the device, while the use of symmetrical optical paths allows to compensate for the imaging errors. See Specification, p. 7, ll. 9-15.

In contrast, the spectroscope of Tanimoto is described only as “a Littrow spectroscope or Czerny-Turner spectroscope.” Tanimoto at col. 6, ll. 5-6. Tanimoto does not teach a system with “a combined array according to Ebert and Fastie” as required by Claim 51. Therefore Claim 51 is patentable over Onaka in view of Derickson and Tanimoto.

Also, as indicated above, neither Onaka, nor Derickson or Tanimoto teach “an optical unit having the optical signal as an input and the particular wavelength portion as an output,” as recited in

claim 45. Since 51, which depends from claim 45, it is allowable over the combination of Onaka, Derickson, and Tanimoto for at least the same reasons as is claim 45.

Claim 53

The Examiner has rejected claim 53 under 35 U.S.C. § 103(a) as being allegedly unpatentable over Onaka in view of Derickson as applied to Claim 50, further in view of U.S. Patent No. 5,748,815 to Hamel et al. (hereafter “Hamel”).

As indicated above, Onaka does not teach “an optical unit having the optical signal as an input and the particular wavelength portion as an output,” as recited in claim 45. Derickson and Hamel do not cure the defect in the teachings of Onaka. Therefore, claim 53, which depends indirectly from claim 45 is allowable over the combination of Onaka, Derickson, and Hamel for at least the same reasons as is claim 45.

Claims 54–56 and 58

The Examiner has rejected claims 54–56 and 58 under 35 U.S.C. § 103(a) as being allegedly unpatentable over Onaka in view of Derickson as applied to Claim 50, further in view of U.S. Patent No. 5,233,405 to Wildnauer et al. (hereafter “Wildnauer”).

As indicated above, Onaka does not teach “an optical unit having the optical signal as an input and the particular wavelength portion as an output,” as recited in claim 45. Derickson and Wildnauer do not cure the defect in the teachings of Onaka. Therefore, claims 54–56 and 58, which depend indirectly from claim 45 are allowable over the combination of Onaka, Derickson, and Wildnauer for at least the same reasons as is claim 45.

Claim 59

The Examiner has rejected claim 59 under 35 U.S.C. § 103(a) as being allegedly unpatentable over Onaka in view of U.S. Patent No. 4,926,429 to Chung et al. (hereafter “Chung”). The Examiner has stated in his rejection that Chung teaches a system “comprising a means for mixing (209) the optical signal (103) with a tunable reference optical signal (202) (see Col. 6, lines 13-18) to produce a combined optical signal (in (210)).” Office Action, p. 10, ll. 3-5. The applicants respectfully disagree.

The mixer 209 of Chung is realized by a coupler (See Fig. 1 of Chung). In the system of Chung the optical signal and the reference signal have the same wavelength. The couplers usually do not have any non-linear properties. Therefore combining of these signals in a coupler result in at most a superimposition, and not mixing of the signals. Therefore, Chung does not teach “means for mixing the optical signal with a tunable reference optical signal to produce a combined optical signal;” as in Claim 59. As a result, Claim 59 is patentable over Onaka in view of and Chung.

Also, as indicated above, Onaka does not teach “an optical unit having the optical signal as an input and the particular wavelength portion as an output,” as recited in claim 45. Chung does not cure the defect in the teachings of Onaka. Therefore, claim 59, which depends from claim 45, is allowable over the combination of Onaka and Chung for at least the same reasons as is claim 45.

Allowable Subject Matter

The Examiner has indicated that claims 41 and 42 are allowable over the prior art. The Examiner has further indicated that claims 52, 57, and 60–67 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and an intervening claims.

Claims 52, 57, 60-67 depend from Claim 45, which is allowable as discussed above, and therefore are allowable for at least the same reasons as claim 45.

Conclusion

In view of the foregoing amendments and remarks, Applicants respectfully request reconsideration and reexamination of this application and the timely allowance of the pending claims.

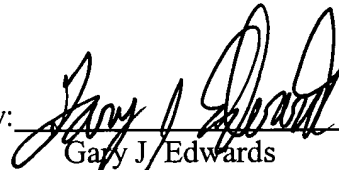
Please grant any extensions of time required to enter this response and charge any additional required fees to our deposit account 06-0916.

Respectfully submitted,

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Dated: October 25, 2004

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